REVIEW DRAFT

Proposed priority action items for Fiscal Year 2003, beginning October 1, 2002.
(Subject to funding availability)
All amounts are estimates, subject to revision and review.*

SUMMARY OF TASKS PROPOSED UNDER WIND POWERING AMERICA

Priority	Task	In-kind amount	In-kind source	Federal amount	Total Cost
1	Wind Working Group	$ 29,820	see details	$ 5,200	$ 35,020
1	Website	$ 2,160	see details	$ 356	$ 2,516
1	Anemometer Loan Program	$ 14,400	see details	$ 18,500	$ 32,900
1	Code Compliance Workshops	$ 14,400	see details	$ 14,000	$ 28,400
2	Portable Exhibits	$ 2,440	see details	$ 25,000	$ 27,440
2	Island-Specific Wind Workshops	$ 19,200	see details	$ 26,000	$ 45,200
3	Wind Educational Fair	$ 16,200	see details	$ 18,500	$ 34,700
	Wind Powering America Total	***$ 98,620***		***$ 107,556***	***$ 206,176***

SUMMARY OF WIND RESOURCE MAP PROJECT

Priority	Task	In-kind amount	In-kind source	Federal amount	Total Cost
1	Wind Resource Map				
		$ 25,000	HECO		
		$ 25,000	DBEDT		
				$ 25,000	
	Mapping Total	***$ 50,000***		***$ 25,000***	***$ 75,000***

* Estimates of value of in-kind contributions of personnel time have not been adjusted on the basis of actual salaries, so may be high or low depending on actual costs.

	Priority	Task	In-kind amount	In-kind source	Federal amount	Total Cost
	1	**Wind Working Group**				
		Details:	$ 7,200	HECO		
		In-kind amount is estimated value	$ 7,200	DBEDT		
	Action	of time contributed by wind	$ 2,160	Kauai Electric		
	Item	working group members.	$ 2,160	HREA		
	1.a.	Not all members have been listed;	$ 1,440	County of Maui		
		listing is ***representative sampling***	$ 1,440	County of Kauai		
		for preliminary planning purposes only.	$ 1,440	Hawaii County		
		(Substantially more participation is	$ 720	Air Force		
		expected.)	$ 720	Christenson Electric		
			$ 720	Other WWG members		
			$ 720	Other WWG members		
		Support for neighbor island travel				
		(10) round trip interisland airfares			$ 1,000	
		(10) car rental coupons			$ 300	
	Action	Travel: AWEA 2003 & WWG Summit				
	Item	6 days travel plus prep/reporting	$ 3,120	HECO		
	1.c.	Airfare (Texas)			$ 1,500	
		Excess Lodging			$ 300	
		Per diem	$ 780			
		Ground Transportation			$ 300	
		Registration Fee			$ 800	
		AWEA membership			$ 1,000	
	1	***Wind Working Group***	***$ 29,820***		***$ 5,200***	***$ 35,020***
	1	**Website**				
	Action	Maintenance	$ 2,160	DBEDT		
	Item	Register domain name: hawaiiwind.org			$ 20	
	1.c.	Setup fee			$ 48	
		Web hosting			$ 288	
	1	***Website***	***$ 2,160***		***$ 356***	***$ 2,516***
	1	**Anemometer Loan Program**				
	Action	Anemometer kits (4)			$ 10,000	
	Item	Installation / removal (4)			$ 8,000	
	4.a.	Install kit			$ 500	
		Program administration	$ 14,400	HREA? HNEI? DBEDT?		
	1	***Anemometer Loan Program***	***$ 14,400***		***$ 18,500***	***$ 32,900***
	1	**Code Compliance Workshops**				
		On Islands of Hawaii and Molokai				
	Action	Coordination, prep, admin, reporting	$ 3,600	HELCO		
	Item	Coordination & preparation	$ 3,600	Hawaii County		
	2.b.	Coordination, prep, admin, reporting	$ 3,600	MECO		
		Coordination & preparation	$ 3,600	Maui County		
		Keynote speaker on "small wind"			$ 8,000	
		Workshop expenses				
		Hawaii			$ 3,000	
		Molokai			$ 3,000	
	1	***Code Compliance Workshops***	***$ 14,400***		***$ 14,000***	***$ 28,400***

Priority	Task		In-kind amount	In-kind source	Federal amount	Total Cost
2	**Portable Exhibits**					
Action Item 2.c.	Renewable trailer	$	1,000	HELCO		
	add Southwest Wind airmarine400					
	Work	$	1,440	HELCO		
	Develop exhibit materials					
					$ 25,000	
2	***Portable Exhibits***	***$***	***2,440***		***$ 25,000***	***$ 27,440***
2	**Island-Specific Wind Workshops**					
	After map completed, one per island					
Action Item 2.b.	Sponsors (at least one per island)	$	4,800	Oahu sponsor		
	Planning & coordination time	$	4,800	Kauai sponsor		
		$	4,800	Maui sponsor		
		$	4,800	Hawaii sponsor		
	Presentation of map by expert				$ 8,000	
	Workshop expenses					
	Oahu				$ 4,500	
	Kauai				$ 4,500	
	Maui				$ 4,500	
	Hawaii				$ 4,500	
2	***Island-Specific Wind Workshops***	***$***	***19,200***		***$ 26,000***	***$ 45,200***

Priority	Task	In-kind amount	In-kind source	Federal amount	Total Cost
3	**Wind Educational Fair**				
	Identify and secure a venue for the fair	$ 600	TBD		
	Secure participation from the technology suppliers	$ 600	TBD		
Action Item 2.c.	Develop a marketing plan, which would include radio and print ads to promote the fair	$ 600	TBD	$ 5,000	
	Solicit co-sponsorship from a local radio station to maximize the marketing budget	$ 600	TBD		
	Develop and print a direct mail piece to promote the fair	$ 600	TBD	$ 1,500	
	Procure door prizes, solicit door prize donations	$ 600	TBD		
	Develop and print drawing coupons for a door prize drawing used to attract customers to the fair	$ 600	TBD		
	Develop and print signage for the fair	$ 600	TBD	$ 2,000	
	Contract with local entertainment groups to provide entertainment at the event	$ 600	TBD	$ 4,000	
	Secure a vendor to provide infrastructure such as booths and tents for the fair	$ 600	TBD	$ 2,000	
	Secure vendor to provide PA and sound system	$ 600	TBD	$ 2,000	
	Secure vendor to cater popcorn and cotton candy	$ 600	TBD	$ 2,000	
	Conduct educational fair	$ 9,000	TBD		

REVIEW DRAFT

A STRATEGIC PLAN FOR THE HAWAII WIND WORKING GROUP

Developed by:

HAWAII WIND WORKING GROUP

Prepared by:

State of Hawaii Department of Business, Economic Development and Tourism

and

Hawaiian Electric Company, Inc.

July 2002

EXECUTIVE SUMMARY

A state wind working group was formed in Hawaii under the Department of Energy's *Wind Powering America* initiative. The inaugural meeting of the Hawaii Wind Working Group (HWWG) was held on April 8, 2002 in Honolulu, Hawaii. Based on the findings of the first meeting, a draft strategic plan was created to serve as a framework for activities aimed at advancing the development of wind energy in Hawaii.

The key objectives identified in the draft strategic plan include:

- Provide a forum for information exchange among member organizations;
- Provide accurate, technically sound information on wind energy to the public and decision makers;
- Provide Hawaii organizations with access to Federal and other resources for the support of wind energy; and
- Encourage the development of demonstration projects and of technically and economically feasible wind projects in an environmentally, socially, culturally, and aesthetically appropriate manner.

Several action items have been proposed by the HWWG to meet the aforementioned strategic objectives. These action items include supporting and expanding activities of the HWWG; collecting and disseminating wind-related information to member organizations, state decision makers, and the public through a variety of means, including a website; updating the existing wind resource maps with higher resolution data by coordinating a comprehensive wind resource assessment; instituting an anemometer loan program; developing educational materials; and sponsoring workshops and fairs.

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STRATEGIC PLAN

1.0 INTRODUCTION

The U.S. Department of Energy (DOE), through its Office of Energy Efficiency and Renewable Energy, manages the federal Wind Energy Program in accordance with national energy policy. The *Wind Powering America* (WPA) initiative, which is part of the Wind Energy Program, is a regional-based effort to increase the use of wind energy in the U.S. over the next two decades. The goals of the initiative are to:

- Provide at least 5% of the nation's electricity from wind energy by 2020;
- Double the number of states with more than 20 MW of wind capacity to 16 by 2005 and triple the number to 24 by 2010; and
- Increase wind's contribution to federal electricity use to 5% by 2010.

DOE field offices and national laboratories carry out various program activities. The DOE Seattle Regional Office (SRO) is the point of contact for the WPA initiative to the states and territories that it serves, namely Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Washington, Guam, American Samoa, the Northern Marianas, and Palau. To help achieve the goals of the WPA initiative, state wind working groups are established with the assistance of the DOE.

Wind working groups are formed at state or local levels to identify state-specific concerns, barriers, and opportunities for wind development. Wind working groups are collaborations of federal, state, and county agencies, research and educational institutions, non-profit organizations, and private businesses interested in wind development. At the time of this writing, five (5) of the eight (8) states served by the DOE SRO have existing wind working groups formed under the WPA initiative. These states include Arizona, Hawaii, Idaho, Nevada, and Washington.

Hawaii depends on fossil fuels for the majority of its energy needs. Unlike U.S. mainland states, Hawaii does not have access to other fuel sources such as natural gas, nuclear power, or large rivers to produce hydropower. Diversifying Hawaii's mix of energy sources by using more renewable energy to produce electricity will help Hawaii use less oil. In addition, increasing renewable energy can help Hawaii meet the goals of the State Renewable Portfolio Standard (RPS).[1] Developing wind energy projects that are technically feasible and economically viable, as well as environmentally, socially, culturally, and aesthetically acceptable can help Hawaii reach these goals. The efforts of a state wind working group can foster this wind energy development.

The following sections of this report describe the Hawaii Wind Working Group and its strategic plan for wind development activities in Hawaii.

[1] Act 272 of the 2001 Hawaii Legislature. RPS states that 7%, 8%, and 9% of electricity sales be represented by renewable energy by the end of 2003, 2005, and 2010, respectively.

2.0 HAWAII WIND WORKING GROUP

This section provides information on the activities, member organizations, mission, and vision of the Hawaii Wind Working Group.

2.1 ACTIVITIES

The Hawaii Wind Working Group (HWWG) was formed under the DOE's WPA initiative. The inaugural meeting of the HWWG was held on April 8, 2002 in Honolulu, Hawaii and was attended by 58 people representing 38 organizations. This meeting was followed by the annual meeting of the Utility Wind Interest Group (UWIG) held on April 9-11, 2002 in Kona, Hawaii (Big Island).

The DOE SRO providedfunding to the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT) to support the formation of the HWWG. The inaugural meeting consisted of presentations on the status of wind energy in Hawaii, panel discussions on technical and non-technical wind energy issues and policies, and concurrent breakout sessions for HWWG and federal agency discussions. The agenda and minutes of the April 2002 meeting are provided in Appendix A and B, respectively. More information on the HWWG, including the presentations made at the meeting, can be found at http://www.state.hi.us/dbed/ert/wwg.

2.2 LEAD AND MEMBER ORGANIZATIONS

The HWWG is co-chaired by DBEDT and Hawaiian Electric Company, Inc (HECO). DBEDT serves as the State's energy office through its Energy, Resources, and Technology Division and HECO is the electric utility serving the island of Oahu. HECO's subsidiary utilities Maui Electric Company, Ltd (MECO) and Hawaii Electric Light Company, Inc. (HELCO) serve Maui County (islands of Maui, Molokai, and Lanai) and the island of Hawaii, respectively.

Public and private organizations and entities from federal, state, and county governments participated in the inaugural HWWG meeting. Participants included:

1. Booz-Allen Hamilton/Akamai Energy Inc.
2. Citizens Energy Services, Kauai Electric Division
3. County of Hawaii
4. County of Kauai
5. County of Maui
6. Electrotek Concepts, Inc.
7. GE Wind Energy
8. enXco
9. Global Energy Concepts, Inc.
10. Hawaii Electric Light Company, Inc.
11. Hawaii Natural Energy Institute – University of Hawaii at Manoa
12. Hawaii Renewable Energy Alliance
13. Hawaii State Energy Office (State of Hawaii Department of Business, Economic Development & Tourism - Energy, Resources, and Technology Division)
14. Hawaiian Electric Company, Inc.
15. Idaho National Engineering and Environmental Laboratory
16. The Leighty Foundation

17. Maui Electric Company, Ltd.
18. MCK Family Partners
19. Na Kupuna O Maui
20. National Wind Coordinating Committee
21. National Wind Technology Center
22. Natural Energy Laboratory of Hawaii Authority
23. Nebraska Public Power District
24. Pacific Power and Environmental
25. Sierra Club
26. State of Hawaii Department of Budget & Finance - Public Utilities Commission
27. State of Hawaii Department of Commerce and Consumer Affairs – Division of Consumer Advocacy
28. State of Hawaii Department of Land and Natural Resources – Planning Division
29. Sustainable Kauai Mission
30. U.S. Air Force
31. U.S. Army
32. U.S. Army/National Guard
33. U.S. Coast Guard
34. U.S. Department of Energy
35. U.S. Environmental Protection Agency
36. U.S. Marine Corps
37. U.S. Navy
38. Wind Utility Consulting

2.3 VISION AND MISSION

The strategy and program activities of the HWWG will be guided by the following vision and mission.

Vision The Hawaii Wind Working Group will be a proactive group of organizations recognized for its collective strategy and cooperative efforts to promote the development of wind energy in Hawaii.

Mission The Hawaii Wind Working Group is committed to facilitating the dissemination of information on wind energy to member organizations, decision makers, and the general public and encouraging the development of technically feasible and economically viable wind projects in Hawaii.

3.0 STRATEGIC PLAN

The first work product developed by the HWWG is a strategic plan consistent with the group's vision and mission. This plan incorporates the salient findings of the inaugural HWWG meeting and serves as the framework for activities to further the development of wind energy in Hawaii. The strategic plan represents a "work in progress" and may be expanded and/or refined as the HWWG matures and as activities are developed.

3.1 OBJECTIVES AND ACTION ITEMS

The strategic plan is comprised of the following key objectives and associated action items.

Objective #1 Provide a forum for information exchange among member organizations.

As stated in its vision, the HWWG will strive to formulate a collective strategy and engage in cooperative efforts to promote wind energy development. Information exchange among member organizations is essential to fulfilling this vision. The following action items have been identified to meet Objective #1.

Action Items

1.a. Meetings

Hold HWWG meetings on an as-needed basis. As resources permit, strive to enable participation from all islands.

1.b. Website

Develop a HWWG website containing wind data, links, and Hawaii-specific wind information and archives.

1.c. Information collection

Obtain current information on wind energy technologies, standards, policies, and economics for sharing with HWWG members and for use in refining plans and activities of the HWWG.

1.d. Information dissemination to members

Provide HWWG members with relevant information (e.g., funding opportunities, technical developments, suggestions from other Wind Working Groups).

Objective #2 Develop and provide accurate, technically sound information on wind energy to the public and decision makers.

The development and implementation of wind energy projects can be influenced by the perception of the general public and decision makers. Increased public awareness of all aspects of wind energy in Hawaii can facilitate the understanding of the potential, benefits, and challenges of wind energy. In addition, the dissemination of accurate and technically sound information to lawmakers and regulators can encourage informed decisions on wind-related issues.

The existing wind resource map for Hawaii was developed in 1981.[2] Higher resolution wind resource assessments will help utilities, wind developers, and interested stakeholders more accurately conduct initial site screenings. Updated wind resource assessments would assist in the selection of specific locations for on-site wind measurement systems. Credible, high quality wind data and estimates of wind farm energy potential are crucial to the success of utility-scale wind energy projects.

[2] Schroeder, T.A. et al. 1981. Wind Energy Resource Atlas: Volume 11 – Hawaii and Pacific Islands Region, prepared by the Department of Meteorology – University of Hawaii, prepared for Pacific Northwest Laboratory under Agreement B-87918-A-L, February.

The following action items are proposed by the HWWG.

Action Items

2.a. Wind resource maps

Develop updated wind resource maps for Hawaii by coordinating a comprehensive wind resource assessment that employs the latest wind data, technologies and methodologies capable of generating higher resolution and more accurate wind resource maps. Future phases may include the evaluation of offshore wind resource potential.

2.b. Workshops

Sponsor targeted workshops to address items of importance to the successful adoption / deployment of wind energy.

2.c. Information dissemination to public

Disseminate wind-related information, including information on large- and small-scale wind projects, to the general public.

Objective #3 Provide Hawaii organizations with access to Federal and other resources for the support of wind energy.

Federal and state funding and other resources to support wind energy projects can stimulate development activity. Providing access to these opportunities will help Hawaii organizations collaborate on potential studies and projects. The HWWG can help meet Objective #3 by performing the following action items.

Action Items

3.a. Identification of funding

Serve as a clearinghouse for Federal, state, and private funding and other resource opportunities related to wind energy development.

3.b. Project coordination

Develop proposals for funding.

Objective #4 Encourage the development of demonstration wind projects and of technically and economically feasible wind projects in an environmentally, socially, culturally, and aesthetically appropriate manner.

This broad-scoped objective encompasses all aspects of wind energy project development. Work efforts such as issue and policy evaluations and economic analyses can help launch and support wind energy projects.

Landowners interested in wind energy development can make use of anemometers (through the anemometer loan program) to quantify the wind resource on their properties. In the process of determining where to site the anemoemeter and making arrangements for installation, they will become much more knowledgeable about wind energy, as will others involved in the project. The collected wind resource data will be publicly available.

The capability to forecast wind conditions, such as wind speed and direction on a short-term basis (e.g., 48, 24, and 12 hours in advance) can help optimize the integration of wind resources. The development of short-term wind forecasting capabilities is considered a long-term objective. The value of this capability would be realized when more commercial wind farms are placed in service.

The following action items for this strategic objective are proposed by the HWWG.

Action Items

4.a. Anemometer loan program

4.b. Support utility scale wind projects

Identify barriers to and opportunities for large-scale wind projects. Develop action plan. Resolve barriers.

4.c. Support customer sited wind projects

Identify barriers to and opportunities for small-scale wind projects. Develop action plan. Resolve barriers.

4.d Include wind in forecasts and planning

Initiate the conceptual planning for the development of short-term wind forecasting capabilities.

4.e. Conduct studies on wind integration

(this item is NEW, for discussion; may overlap previous action item)

1) System Economics Studies for High Penetration of Intermittent Resources: The County of Hawaii will soon have the highest penetration of intermittent resources in the US and can serve as a laboratory for understanding the system economics and underlying operational issues associated with wind and other distributed renewables.
2) System Technical Operations Studies for High Penetration of Intermittent Resources: There are several operational issues related to the integration of intermittent resources that should be understood in detail, such as management of voltage stability, frequency, and reactive power.
3) Energy Storage Options: Given the excess amount of renewable power versus the system loads (particularly in the outer islands), storage technologies should be researched to address system problems at the frequency time scale (seconds) and longer term (minutes/hours). Technologies ranging from fuel cells to pumped storage are applicable.
4) Island-Specific Assessments of Wind Energy Integration: An island-by-island evaluation of how each island's energy system works, how much (and where) renewable power can be meaningfully integrated into the grid, and means of addressing technical challenges is needed.

3.2 NEXT STEPS

The next steps of the HWWG will be:

- Refine and adopt the HWWG strategic plan;
- Further refine action items and budget; identify partners; seek additional funding if needed;
- Implement plans to complete the action items identified in the strategic plan; and

- Continue to foster communication within and about the HWWG; convene meetings as needed.

The co-chairs of the HWWG will coordinate the group's next steps and initiate communications with member organizations. Additional support from the U.S. Department of Energy may be considered and pursued.

4.0 CONCLUSIONS

The continuation and growth of the Hawaii Wind Working group under the DOE's WPA initiative can help catalyze efforts to further develop wind energy in Hawaii. More specifically, the HWWG will provide a forum to: (1) identify technical and non-technical barriers to wind energy development, including wind penetration and interconnection issues, land availability, and environmental and public acceptance issues and (2) identify and coordinate activities to address these barriers.

A strategic plan that is consistent with the vision and mission of the HWWG will serve as a framework for wind development activities. The underlying themes of the objectives and action items presented in this strategic plan are the facilitation of information exchange and the coordination of resources to implement wind energy studies, demonstration wind projects and commercial wind projects in the state of Hawaii.